

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Air Permits Program

TECHNICAL ANALYSIS REPORT
For
Air Quality Control Minor Permit No. AQ1183MSS02

Doyon Utilities, LLC
Fort Greely Real Estate

Backup Generator Replacement Project

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Abbreviations/Acronyms

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
AS	Alaska Statutes
ASTM	American Society of Testing and Materials
CHPP	Central Heat and Power Plant
C.F.R.	Code of Federal Regulations
DU	Doyon Utilities
EPA	Environmental Protection Agency
HHV	Higher heating value
NA	Not Applicable
NSPS	New Source Performance Standard
NESHAP	National Emission Standard for Hazardous Air Pollutants
PSD	Prevention of Significant Deterioration
PTE	Potential to Emit
TBD	To Be Determined

Units and Measures

bhp	brake-horsepower
gr./dscf	grains per dry standard cubic feet (1 pound = 7,000 grains)
dscf	dry standard cubic foot
gph	gallons per hour
MW	megawatt
lbs	pounds
lb/hp-hr	pound per brake-horsepower hour
mmBtu	million British Thermal Units
ppm	parts per million
ppmv	parts per million by volume
tpy	tons per year
wt%	weight percent

Pollutants

CO	Carbon Monoxide
NO _x	Oxides of Nitrogen
NO ₂	Nitrogen Dioxide
NO	Nitric Oxide
PM-10	Particulate Matter with an aerodynamic diameter less than 10 microns
SO ₂	Sulfur Dioxide
VOC	Volatile Organic Compound

1. Introduction

This Technical Analysis Report (TAR) provides the Alaska Department of Environmental Conservation's (Department's) basis for issuing Air Quality Control Minor Permit AQ1183MSS02 to Doyon Utilities, LLC (DU) for the privatized portion of the Fort Greely Real Estate stationary source. This minor permit authorizes DU to replace a total of five existing backup generators with four new generators, and to operate the new units under a revised owner requested limit (ORL). As described in Section 3, the Department intends to incorporate the minor permit into the DU's Title V permit as an administrative amendment under 18 AAC 50.326(c)(2).

1.1 Stationary Source Description

The Fort Greely Real Estate stationary source is split between two owners/operators. DU owns and operates the "privatized" portion, which consists of the emission units in Building 606 and 625. The remaining "non-privatized" emission units are owned and operated by the US Army Garrison – Fort Greely (FGA). DU is currently operating its emission units under Minor Permit AQ1183MSS01 and Operating Permit AQ1183TVP01. FGA is operating its emission units under Minor Permit AQ0238MSS02 and Operating Permit AQ0238TVP02.

The above permits include various ORLs to cap the combined oxide of nitrogen (NO_x) emissions to 207.8 tons per year (tpy). The purpose for the ORLs is to avoid classification as a major Prevention of Significant Deterioration (PSD) stationary source.

1.2 Project Description

DU is planning to replace five existing backup generators (emission units FGIC05 – FGIC09) with four 3 megawatt diesel-fired Caterpillar C175-16 standby generators (emission units FGIC18 – FGIC21). DU is also requesting revisions to their existing ORLs, which triggers the minor permitting requirements under 18 AAC 50.508(6). The details of DU's proposal are described below.

DU intends to replace the existing units in two phases. During Phase 1, DU will replace emission units FGIC05 – FGIC07 (which they have already removed), with emission units FGIC18 – FGIC19. During Phase 2, DU will replace emission units FGIC08 – FGIC09 with emission units FGIC20 – FGIC21.

DU is asking to operate all four new units (FGIC18 – FGIC21) under a combined limit of 5,620 hours per year (hr/yr).¹ DU's intent for establishing the ORL is to maintain the previously established PSD-avoidance strategy and ambient air conditions.²

¹ The phrase "hours per year" should be interpreted "hours per 12-month rolling period." The Department is using the "hour per year" nomenclature to improve the readability of this TAR.

² DU reduced the originally requested limit of 5,920 hr/yr to 5,620 hr/yr on September 28, 2009. The original request lead to a 9 ton per year (tpy) increase in NO_x emissions. The emissions increase would have triggered the need for a revised ambient demonstration per 18 AAC 50.540(k)(3) since DU would be exceeding a previously established ambient air limit. With the reduced limit, there is no increase in NO_x emissions and therefore, no obligation to revise their ambient demonstration.

Since the existing emission units will be removed in phases, DU is also asking for an interim ORL of 2,960 hr/yr in order to keep the source-wide potential emissions below the 250 tpy PSD-threshold. The interim ORL would remain in place until emission units FGIC08 – FGIC09 are removed.

The Department incorporated DU's requested interim ORL into Minor Permit AQ1183MSS02. However, the Department structured the condition so that the interim ORL is applicable to all four new units (FGIC18 – FGIC21), even though DU only intends to install only two of the new units during the interim phase. This approach simplified the overall permit structure by eliminating the need for addressing the status of Emission Units FGIC20 – FGIC21 during the interim phase. It also provides DU the maximum flexibility for installing the new units without jeopardizing their PSD-avoidance strategy.

DU requested a minor editorial change to the unit description in Table 1 of Minor Permit AQ1183MSS01 in regards to Emission Unit FGIC12. The Department incorporated the requested change in Minor Permit AQ1183MSS02.

1.3 Emissions Summary and Permit Applicability

Table 1 shows the change in Potential to Emit (PTE) of the Fort Greely Real Estate stationary source due to the backup generator replacement. Table 2 shows the change in PTE during the interim phase with the interim ORL. All emissions are in tons per year (tpy). As shown in Table 1 and Table 2, this project is not classified under 18 AAC 50.502(c)(3).

Table 1- Minor Permit Applicability (Generator Replacement Project)

Activity	ORL (hr/yr)	Pollutant (tpy)				
		NOx	PM-10	SO ₂	CO	VOC
Remove Generators (FGIC05-FGIC07)	5,850	-101.1	-2.9	-3.67	-23.2	-3.0
Remove Generators (FGIC08-FGIC09)	3,200	-67.8	-2.0	-2.46	-15.5	-2.0
Install New Generators (FGIC18-FGIC21)	5,620	168.8	1.7	0.12	36.5	7.2
Change in PTE		-0.1	-3.2	-6.0	-2.2	2.2
Minor Permit Applicability Threshold		10	10	10	N/A	N/A
Minor Permit Required Under 18 AAC 50.502(c)(3)?		No	No	No	N/A	N/A

Table 2- Minor Permit Applicability (Interim Phase)

Activity	ORL (hr/yr)	Pollutant (tpy)				
		NOx	PM-10	SO ₂	CO	VOC
Remove Generators (FGIC05-FGIC07)	5,850	-101.1	-2.9	-3.67	-23.2	-3.0
Install New Generators (FGIC18-FGIC21)	2,960	88.9	0.9	0.06	19.2	3.8
Change in PTE		-12.2	-2.0	-3.6	-4.0	0.8
Minor Permit Applicability Threshold		10	10	10	N/A	N/A
Minor Permit Required Under 18 AAC 50.502(c)(3)?		No	No	No	N/A	N/A

Without the interim ORL, the source-wide potential NOx emissions would be 276 tpy during the interim phase (208 existing, minus 101 removed, plus 169 new), which exceeds the 250 tpy

PSD-major source threshold. Therefore, the interim ORL is needed to avoid a PSD-major classification for the stationary source.

DU assumed the new generators will burn ultra-low sulfur diesel (ULSD) fuel, which has a maximum fuel sulfur content of 15 parts per million (0.0015 percent by weight). This is significantly lower than the 0.12 percent ambient air limit allowed under Minor Permit AQ1183MSS01. If DU had used the 0.12 percent value for the new units, the source-wide SO₂ emissions would have increased by 3.6 tpy rather than decreased by 6 tpy. While this increase would *not* have triggered the minor permit classification under 18 AAC 50.502(c)(3), it *would* have nevertheless required a revised SO₂ ambient demonstration under 18 AAC 50.540(k)(3). Therefore, the Department is imposing the 0.0015 percent assumption as a permit limit established to protect the SO₂ Alaska ambient air quality standards (AAQS) and maximum allowable increases (increments).³

Table 3 shows the stationary source's revised assessable emissions due to the backup generator replacement project. The total assessable emissions are determined source-wide, but do not include pollutants that are emitted at less than 10 tpy, per 18 AAC 50.410. Since the new *source-wide* PTE for PM-10 is less than 10 tpy, the PM-10 emissions are not included in the revised assessable emissions. DU's portion of the revised assessable emissions is therefore their total PTE minus the PM-10 portion, or 294.3 tpy (300.3 tpy minus 6.0 tpy).

Table 3- Fort Greely Real Estate Assessable Emissions (tpy)

Pollutant	Current DU PTE	Current Source-Wide PTE	Change in DU PTE	New DU PTE	New Source-Wide PTE
NO _x	205.6	207.8	-0.1	205.5	207.7
PM-10	9.2	12.3	-3.2	6.0	9.1
SO ₂	35.8	37.0	-6.0	29.8	31.0
CO	52.8	68.6	-2.2	50.6	66.4
VOC	6.2	11.8	2.2	8.4	14.0
TOTAL	309.6	337.5	-9.3	300.3	328.2
Assessable	309.6	337.5	N/A	294.3	319.1

1.4 Department Findings

The Department has made the following findings regarding DU's application:

1. Revising the existing Title I permit conditions described in the application requires a minor permit under 18 AAC 50.508(6).
2. As shown in Table 1 and Table 2, this project is *not* classified under 18 AAC 50.502(c)(3).

³ DU will be required to burn ULSD in the new emission units starting October 1, 2010 under Subpart IIII of the New Source Performance Standard (NSPS). However, this obligation does not preclude the Department from imposing the ULSD requirement as a limit to protect the SO₂ AAQS and increments.

3. The project's new fuel-burning emission units are subject to the visible emission standards in 18 AAC 50.055(a)(1), the particulate matter standards in 18 AAC 50.055(b)(1), and the sulfur-compound emission standard in 18 AAC 50.055(c).
4. DU's requested annual operating limits are needed to maintain the existing PSD avoidance strategy for the Fort Greely Real Estate stationary source, as well as to protect the annual average AAAQS/increments.
5. DU's assumed 15 ppm fuel sulfur content for the new generators averted the need for revising the SO₂ ambient air demonstration. The Department is therefore imposing the 15 ppm fuel sulfur assumption as a limit established to protect the SO₂ AAAQS and increments.
6. DU requested that the Department administratively amend the current operating permit, AQ1183TVP01, to include the revisions of Minor Permit AQ1183MSS02. The minor permit therefore includes the applicable Title V provisions, as required under 18 AAC 50.326(c)(2).
7. DU's request to remove Condition 10 of Minor Permit AQ1183MSS01 (vendor/source test requirements for Emission Units FGIC08 and FGIC09) is premature since these units are still part of the active emission unit inventory. The Department has therefore kept Condition 10 as is.
8. The project will decrease the total potential emissions for the Fort Greely Real Estate stationary source. The Department is therefore reducing DU's portion of the assessable emissions.

2. Permit Requirements

2.1 Requirements for All Minor Permits

As described in 18 AAC 50.544(a), each minor permit issued under 18 AAC 50.542 must identify the stationary source, the project, the Permittee, contact information, the requirement to pay fees, and the applicable standard permit conditions in 18 AAC 50.345.

The permit cover page identifies the stationary source, project, the Permittee and contact information. The permit also includes the revised assessable emissions shown in Table 3 of this TAR; and the standard conditions needed to make the permit enforceable.

2.2 Requirements for a Minor Permit that Revises or Rescinds a Previous Title I Permit

As described in 18 AAC 50.544(i) a minor permit classified under 18 AAC 50.508(6) must contain terms and conditions as necessary to ensure that the Permittee will construct and operate the stationary source in accordance with 18 AAC 50. Minor Permit AQ1183MSS02 maintains the PSD-avoidance and ambient air protection strategies previously developed under Minor Permit AQ1183MSS01. The Department also added language to those ambient air conditions revised by Minor Permit AQ1183MSS02 to clarify the purpose for those conditions. The Department derived the purpose for these conditions from the TAR developed in support of

Minor Permit AQ0238MSS01 (Fort Greely Real Estate: Fort Greely and Missile Defense Disaggregation).

2.3 Requirements for Processing this Minor Permit under 18 AAC 50.326(c)

DU requested that the Department incorporate this minor permit into the Title V permit as an administrative amendment under 18 AAC 50.326(c)(2). The minor permit must therefore contain “all of the permit content” required for a Title V permit. This required the Department to include the following elements in the minor permit.

2.3.1 State Emission Standards

As stated in Section 1.4, the new generators are subject to the visible emission standards in 18 AAC 50.055(a)(1), the particulate matter standards in 18 AAC 50.055(b)(1), and the sulfur-compound emission standard in 18 AAC 50.055(c). DU provided a demonstration for each of these obligations in “Tab D” of their application. The Department incorporated these obligations in Minor Permit AQ1183MSS02. The Department also included the on-going monitoring, recordkeeping and reporting (MR&R) obligations in order to administratively amend the Title V permit.

2.3.2 New Source Performance Standards (NSPS)

The new generators are subject to the NSPS Subpart IIII requirements. The Department therefore included these provisions, along with the following footnote.

The U.S. Environmental Protection Agency (EPA) is responsible for enforcing the NSPS and NESHAP requirements within the State of Alaska. However, the NSPS and NESHAP provisions must be included in the Title V permits since they are applicable federal requirements. The Department is therefore providing for informational purposes only, the applicable NSPS and NESHAP requirements for Emission Units FGIC18 through FGIC21. In the case of inconsistency between this minor permit and federal rule, federal rule will prevail. These provisions have listed here for purposes of incorporating all applicable requirements into the Title permit under the administrative amendment process in 18 AAC 50.326(c)(2). The provisions may be amended, as warranted, in the Title V permit without revising the underlying minor permit.

2.3.3 National Emission Standards for Hazardous Air Pollutants (NESHAP) Applicability

Fort Greely Real Estate is an area source for hazardous air pollutants. Therefore, Emission Units FGIC18 – FGIC21 are subject to the National Emission Standards for Hazardous Air Pollutants (NESHAP) Subpart ZZZZ for stationary reciprocating internal combustion engines (RICE). This subpart applies to any existing, new or reconstructed stationary RICE located at a major or area source of HAP emissions, excluding stationary RICE being tested at a stationary RICE test cell/stand. The new generators are considered new stationary RICE, as described in 40 C.F.R. 63.6590(a)(2)(iii), because these engines are located at an area source of HAP emissions and DU will commence construction after June 12, 2006.

Pursuant to 40 C.F.R. 63.6590(c), the new generators must meet the requirements of NSPS Subpart JJJJ to meet the requirements of NESHAP Subpart ZZZZ. The Department has incorporated this requirement into Minor Permit AQ1183MSS02.

3. Permit Administration

None of the provisions of Minor Permit AQ1183MSS02 are prohibited by Operating Permit AQ1183TVP01. While the Department is deleting some of the existing monitoring, recordkeeping and reporting (MR&R) requirements, the deleted sections only pertain to *removed* emission units (i.e., there is nothing to monitor and report since the units no longer exists). The Department therefore considers the Title I revisions as “Off Permit” changes, as described in 40 CFR 71.6(a)(12). DU may therefore operate the new generators upon issuance of the minor permit.

The Department intends to incorporate Minor Permit AQ1183MSS02 into Operating Permit AQ1183TVP01 under the administrative amendment procedures described in 18 AAC 50.326(c)(2), as requested by DU.